

striction 3·8; mastoid breadth 11·6; front of canine to back of m^3 7·5; front of lower canine to back of m_3 8·5.

Hab. Mangala, N. of Gondokoro.

Type. Adult male. B.M. no. 2. 7. 4. 3. Collected and presented by W. L. S. Loat, Esq.

I cannot find any known species to which this *Nyctinomus* can be assigned. None of Heuglin's show any relation to it, even apart from the peculiar gland above described, which he might have overlooked. It is curious that the two Mangala species should each be distinguished by a glandular structure unique of its kind.

L.—Notes on Irish Species of Eylais.

By J. N. HALBERT.

PREVIOUS to the publication of Dr. Koenike's paper on *Eylais* * in 1897 only a single species—*E. extendens*, Müller—was recognized by zoologists; but it was apparent that the genus contained many type forms differing from one another quite as much as those of *Hydrachna*. Several papers on *Eylais* have since been published, containing descriptions of new species, so that the genus now promises to outnumber in species most genera of water-mites.

Many of the large red mites which may be commonly found during the summer months amongst plants growing in stagnant or slowly flowing water are referable to species of *Eylais*. In size they are the giants of the Hydrachnidæ, often reaching 5 or 6 millimetres in length.

Perhaps the most notable characteristics of this genus are, in the first place, the structure of the eye-plates, the four lenses of which are grouped together on a chitinous plate placed anteriorly in the middle line of the body, and the peculiar way in which these mites swim. Only the first three pairs of legs are then brought into play; the fourth pair, being without the long swimming-hairs, are trailed in an extended position, rather suggestive of a pair of rudders, while the animal swims.

The species of *Eylais* are very similar in general shape. The specific characters are founded on the comparative structure of the hard chitinous parts of the body, especially of the eye-plates, mouth-organs, and palps. All of these characters vary more or less in the same species, so that it is

* 1897, Koenike, "Zur Systematik der Gattung *Eylais*, Latreille," Abh. Ver. Bremen, Bd. xiv. pp. 279-295.

often difficult to distinguish type forms from the numerous varieties and aberrations which may be grouped around them. As in other freshwater groups, many of the species are widely distributed.

Records of some of the English species have been published by Mr. C. D. Soar *, and I have to thank that gentleman for the loan of types; also Dr. Sig Thor; and especially Dr. F. Koenike for his kindness in sending a number of valuable type species for comparison. Messrs. C. W. Buckle, G. P. Farran, W. F. de V. Kane, S. W. Kemp, H. L. Orr, and M. S. D. Westropp have kindly assisted me in collecting specimens.

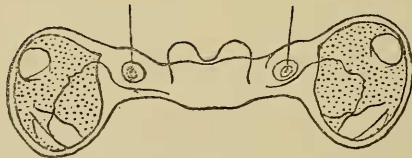
In the following pages twelve species of *Eylais* are enumerated, nine of which are referable to known forms, while the remaining three are described as new; also two varieties.

Eylais hamata, Koen.

1897. Abh. Ver. Bremen, Bd. xiv. pp. 282, 295, fig. 1.

This species is remarkable for the great length of the eye-plate and the relatively small size of the capsules. The prevalent Irish form has the chitinous bridge connecting the latter either straight or more or less bent backwards, and shows no trace of the marginal prominences figured by Piersig (Deutschl. Hydrach. pl. xviii. fig. 168 *d*). However, I have seen Dr. Koenike's mounted types † of this species, and have no hesitation in recording the Irish mite as above.

Fig. 1.



The eye-plate ‡ of an aberration of this species is figured (fig. 1). In this specimen a chitinous process springs from

* 1900, Soar, C. D., "British Freshwater Mites," 'Science Gossip,' vol. vii. (n. s.) pp. 203, 204, figs. 1-3; 1901, id. ib. vol. viii. (n. s.) pp. 68-70, figs. 1-8.

† Dr. Koenike's slide contains dissections of two specimens: one has the pointed prominences on the front of the eye-plate, the other is without these, agreeing with the Irish form in every respect. There can be no doubt that these two forms belong to the same species, as they otherwise agree in structure.

‡ With the exception of figure 9 ($\times 72$) all the accompanying figures of eye-plates are drawn to the same magnification ($\times 94$). As they are taken from Canada balsam mounts, an allowance should be made for alterations in the outline of the delicate lenses caused by the pressure of the cover-glass.

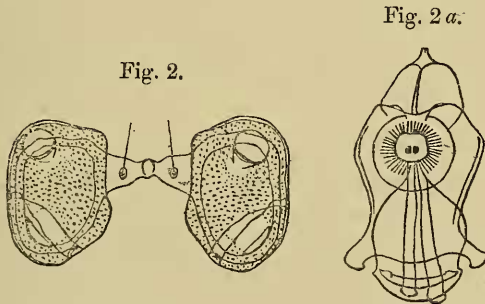
the middle of the underside of the bridge, and projects beyond the front margin in the shape of two round humps, one on each side of the middle line. This process serves for a muscle-attachment, such as may be found occasionally in most species; it is of no importance as a specific character.

Evidently a widespread species. I have taken it commonly in the Royal Canal, Portmarnock Ponds, and in other places near Dublin; in the River Barrow; and in brackish water on the coast of County Wexford.

Eylais Koenikei, sp. n.

This species bears some resemblance to *E. falcata*, Koenike, but differs considerably in the details of its structure.

Length about 3 millim.; the body is more rotund and less depressed than is usual in this genus. The eye-plate (fig. 2)



measures .40 millim. across at the widest part, length of single capsule .21 millim. The eye-capsules are roughly quadrate in outline, covered with large rather diamond-shaped markings; anterior and outer margins weakly rounded, inner margin distinctly emarginate, swollen posteriorly. Bridge* connecting the eye-capsules very slender, becoming gradually narrower towards the middle, where there is a small oval muscle-attachment; about midway between this and the capsule on each side there is a hair-papilla.

The capitulum (fig. 2 a) measures about .60 millim. along the middle line of the maxillary plate; viewed from the front the lateral and distal margins are moderately emarginate; the latter is curved outwards in the centre, not joined

* The position of the bridge evidently varies; in a less developed specimen it is nearer the front margin of the eye-capsules, and the hair-papillæ are closer to the latter. The posterior lens also is of the usual oblong shape.

with the pharynx. The lateral processes stand out rather abruptly from the sides, slightly recurved at the inner angles. The pharynx is broad and strongly rounded at the sides; air-tubes about as long as the pharynx.

The palps are rather long and slender, measuring about 1.26 millim. in length. Second segment* with 4 or 5 weakly feathered spines along the distal margin. Third with 7 or 8 short stout spines on the distal corner, one or two of the innermost of these distinctly feathered. Fourth with about 10 long spines towards the inner margin; six of these are arranged more or less in pairs.

Locality. Collected by Mr. H. L. Orr in Lough Gullion, County Armagh, May 1901.

Eylais Koenikei may be compared with the North-American species *E. falcata*, Koen. The bridge connecting the eye-plates is much longer and narrower in the Irish species. Another difference is in the position of the hair-papillæ, which in *falcata* are situated on the inner corner of the eye-capsules, not on the bridge. In *falcata* also the pharynx is of a regular long oval shape, quite unlike that of *E. Koenikei*.

Eylais extendens (Müller).

1776. Müller, O. F., Zool. Dan. Prodr. p. 190. no. 2272.

The species figured † by Piersig as the type of *E. extendens* (Müller) occurs in Ireland, although it is not by any means the commonest species found there. The eye-plate varies chiefly in the depth of the posterior emargination, also in the outline of the anterior margin, which may be quite straight, or with a marked indentation in the centre.

Eylais symmetrica, sp. n.

A large species, measuring about 4 millim. in length.

The eye-plate (fig. 3) is very large and of a marked type of structure, rather resembling that of *E. perincisa*, Ribaga; greatest breadth across .51 millim., length of single capsule .30 millim. Anterior margin of the bridge with an evenly rounded hump on each side of the middle line, divided by a sharply pointed rather deep indentation; muscle-attachment large and circular, with or without a long chitinous process. Posterior emargination very deep, equalling two thirds the

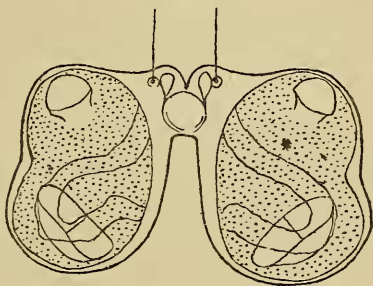
* Throughout these descriptions the spines clothing the inner surface of the palps are alone referred to, as in this respect the inner surface is always the most characteristic.

† 1900, Deutschlands Hydrachniden, pl. xlviii. figs. 119 a-h.

length of the eye-capsules; the latter are kidney-shaped, with large lenses.

In lateral view the sides of the capitulum are very deeply emarginate, with long side-processes; these do not project much beyond the distal margin, which is therefore but

Fig. 3.



moderately emarginate. Palps long; length of the three terminal segments $\cdot 25$, $\cdot 46$, and $\cdot 18$ millim. respectively; inner corner of third segment with about 10 short stout spines, a few distinctly feathered. Fourth segment with about 4 long spines near the inner margin, which is well developed, and a group of 6 shorter strongly feathered spines close to the distal margin.

Locality. Found in brackish water on the coast of County Wexford.

Eylais neglecta, Sig Thor.

1899. Arch. Naturv. Christian. vol. xxi. p. 12, pl. xvii. figs. 156-158.

A form resembling this species occurs in Ireland. The group to which it belongs is an extremely difficult one to differentiate with any degree of certainty. I have taken specimens approaching very closely to *E. similis*, Thon, *E. tenera*, Thon, *E. rimosa*, Piersig, &c., in the structure of the eye-plates. Owing, however, to the great variation which occurs, I should prefer to treat these Irish specimens as varieties or aberrations of the same species.

Eylais undulosa, Koenike.

1897. Abh. Ver. Bremen, Bd. xiv. pp. 283, 295, fig. 2.

This is certainly an Irish species; specimens taken in the Royal Canal, near Dublin, agree very well with the types

lent by Dr. Koenike. In the Irish examples the inner corner of the third palp-segment is rather well developed, with from 12 to 14 short stout spines, *none* of which are feathered.

Eylais Soari, Piersig.

1899. Zool. Anzeiger, Bd. xxii. p. 67, fig. 8.

The type form of this species occurs but rarely; the prevalent form found here should, I think, be referred to a distinct race or variety of *E. Soari*.

instabilis, var. n.

My specimens of this variety agree in size with those described by Dr. Piersig, ranging from 3 to 4 millim. in length; yet the eye-plate and palps are uniformly larger, and there are other differences in structure.

The eye-plate (figs. 4 and 5) measures from .45 to .48 millim. across, length of capsule about .25 millim., of more

Fig. 4.

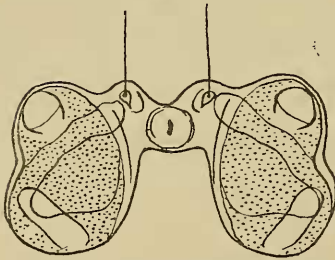
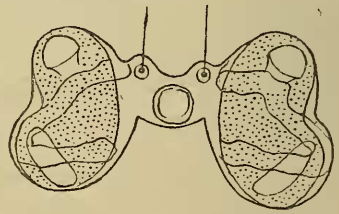


Fig. 5.



robust structure than in the type. Bridge somewhat longer and broader, with the posterior emargination either round or more or less sharply angled.

The capitulum measures about .66 millim. from the front margin of the maxillary plate to end of pharynx; the type of structure greatly resembles that of *E. Mülleri*, Koenike (Deutschl. Hydrach. pl. xlvi. fig. 153 a). The palps are robustly built, length about 1.20 millim. Inner corner of third segment well developed, with from 14 to 18 short stout spines, the innermost ones weakly feathered. Fourth segment strongly swollen on the inner margin, near which there are about 6 long spines, and the usual group of 4 or 5 strongly feathered spines close to the distal margin.

Localities. Common in quarry holes near Crumlin and

Raheny, Grand Canal near Dublin, also in Lough Gur, Co. Limerick.

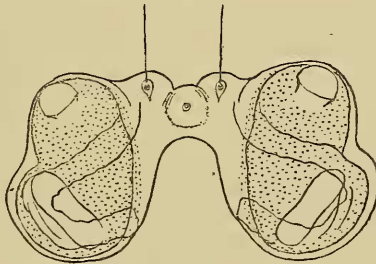
This variety is closely allied to *E. variabilis*, Sig Thor, recently described from Norway. Here, again, the uniformly larger size of the eye-plate obtains. In *variabilis* the inner corner of the third palp-segment bears fewer, longer, and more distinctly feathered spines.

Eylais triarcuata, Piersig.

1899. Zool. Anzeiger, Bd. xxii. p. 66, fig. 7.

An *Eylais* closely resembling this species occurs rather commonly near Dublin and elsewhere in Ireland. In these specimens the central muscle-attachment invariably over-reaches the front margin of the eye-plate, but not so prominently as in Piersig's figure. As this is a very unsatisfactory character, it may be best to record this species with reserve. The eye-plate (fig. 6) varies greatly in outline, and, as usual,

Fig. 6.



the posterior emargination may be truncate or evenly rounded. The capitulum also varies, and resembles that of *Eylais Mülleri* in structure. On the inner corner of the third palp-segment there are usually from 14 to 16 short spines, some of these are feathered.

Perhaps this Irish form should be referred to a variety of the North-American species *E. triangulifera*, Koenike, of which I have seen the types. So far as the eye-plates are concerned, the differences are slight.

Eylais unisinuata, Croneberg.

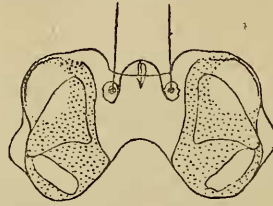
1902. Bull. Imp. Moscou, p. 98, figs. 9 a-c.

Last June I took this species in some numbers in the

River Corrib, near Galway. The following is a short description based on these specimens:—

The eye-plate is of medium size ($\cdot38 \times \cdot20$ millim.). In the type form the anterior margin is shallowly emarginate in the centre; posterior emargination deep and truncate. The outline, however, is very variable; one of the most marked aberrations is shown in fig. 7. A notable point is the strong

Fig. 7.



sinuation of both the inner and outer margins of the eye-capsules. Central muscle-attachment large, semicircular in shape, reaching as far as or beyond the anterior margin.

The capitulum measures $\cdot75$ millim. from the apex of the mandibles to end of pharynx; length of maxillary plate $\cdot46$ millim., rather deeply emarginate distally and curved outwards at the centre; lateral processes directed downwards, variable in length. Pharynx relatively broad ($\cdot23$ millim.), sinuate on each side near the apex.

The palps are rather long ($1\cdot40$ millim.); second segment with four spines towards the inner end of the distal margin; third with the inner corner moderately developed, with 8 or 9 stout spines; some of these are feathered.

Eylais spinipons, Sig Thor.

1897. Arch. Natury. Christian. vol. xx. p. 9.

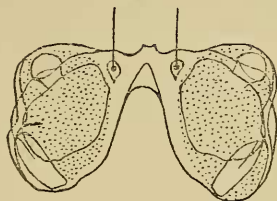
1899. Ibid. vol. xxi. pl. xvii. fig. 164.

The eye-plate (fig. 8) measures about $\cdot38$ millim. across, length $\cdot23$ millim. Anterior margin relatively straight, produced at centre into a two-pointed prominence, much as in the type form of *infundibulifera*, Koenike; hinder emargination very deep and rounded. Capitulum short and broad, distal margin only moderately emarginate. Air-tubes shorter than the pharynx; the latter is narrow and of comparatively uniform breadth throughout.

Palps stoutly built; second segment with about 8 feathered spines along the distal margin; third with the inner corner

rather weakly developed, with from 12 to 14 rather slender feathered spines; fourth with very numerous spines grouped irregularly along the sinuate inner margin.

Fig. 8.



Localities. Fish Pond near Gorey, and at Enniscorthy, County Wexford; also in the Portmarnock Brickfields, near Dublin.

Eylais infundibulifera, Koenike.

1897. Abh. Ver. Bremen, Bd. xiv. pp. 284, 295, figs. 3, 4.

This is probably the commonest and most generally distributed species in Ireland. I have taken it at Lough Neagh; in the River Corrib, Galway; the Blackwater, Co. Cork; Lough Gur, Co. Limerick; and at various localities near Dublin.

The eye-plate of this species is subject to great variation. I have seen Dr. Koenike's type specimens, and, as he has himself clearly stated, there can be no doubt that this species is the same as *E. bifurca*, Piersig. Dr. Koenike's specimens agree excellently with the description and figures of the last-named species (Deutschl. Hydrach. pl. xli. figs. 120 a, b).

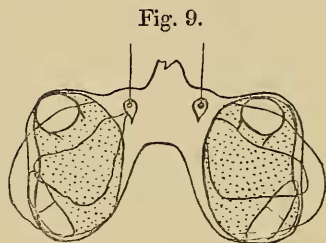
The following is a description of an *Eylais* which, although it differs very strikingly from the type form of *infundibulifera*, Koenike, should, I think, be referred to a variety of that species. It may be called

stagnalis, var. n.

The eye-plate (fig. 9) is very large, measuring about .50 millim. across, length of single capsule .30 millim. Anterior margin produced at centre in a narrow irregularly pointed process, the apex of which serves for a muscle-attachment; on each side of this the bridge is slightly undulate; posterior emargination broad, deep, and evenly rounded, leaving a chitinous bridge, varying from .05 to .10 millim. in

breadth, connecting the eye-capsules. The latter are sinuate on the outer margins, with large cup-shaped and oblong lenses. The lip of the opening on the underside of the eye-plate may be broad, as in figure, or very narrow, causing a great difference in outline.

The capitulum (fig. 9 a) measures about .63 millim. along



the middle line of the maxillary plate, somewhat deeply emarginate distally, with outwardly and downwardly directed lateral processes, the apices of which are recurved; the pharynx is relatively narrow and of very uniform breadth towards the apex; cuticular ring sinuate.

The palps are long (nearly 2 millim.) and heavily built, like those of *infundibulifera* in structure. Inner corner of second segment with 7 or 8 spines; a group of four of these is situated on the extreme inner corner. Third segment with about 18 comparatively long spines on and near the inner corner; most of these are strongly feathered, and there are 5 or 6 additional spines along the distal margin. Fourth segment clothed with very numerous bristles.

Locality. Portmarnock Brickfields, near Dublin, June 1899.

Eylais celtica, sp. n.

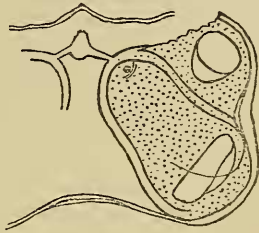
The type of this species measured about 4 millim. in length, very depressed in form, with relatively large epimeral plates.

In the structure of the eye-plate* (fig. 10) allied to *E. hungarica*, Daday, but the anterior prominence is obtusely pointed in the centre, not tongue-like as in that species, and the eye-capsules are quite different in outline, being widest

* In the type specimen the eye-plate was somewhat injured during mounting in balsam.

anteriorly. The anterior margin of the eye-plate extends in front of the eye-capsules, very obtusely pointed in the centre; posterior margin widely and very shallowly emarginate. Very characteristic is the small oval muscle-attachment, which is connected by a very narrow chitinous band with the

Fig. 10.



rim of the eye-capsules. The latter are notably wider in front than behind; sinuate on both the inner and outer margins; lenses large and of the usual shape.

The capitulum is broadly built, length of the maxillary plate about .58 millim. Seen from the front the lateral and distal margins are only moderately emarginate; side-processes short, curved sharply inwards at their apices. The pharynx greatly resembles that of *E. infundibulifera*, var. *stagnalis* (see fig. 9a) in outline. Air-tubes shorter than the pharynx.

The palps are about 1.75 millim. in length. Second segment with 4 or 5 feathered spines on the distal margin and a group of four more on the extreme inner corner. Third segment with about 20 long strongly feathered spines in the vicinity of the inner distal corner, which is moderately developed. Fourth with many long bristle-like hairs grouped towards the inner margin, becoming more numerous at the distal end of the segment, many feathered.

Locality. Found in Ballynahinch Lake, County Galway, by Mr. W. F. de V. Kane, June 1900.

LI.—*Remarks upon the Morphology and Systematics of certain Chilognathous Diplopods.* By R. I. Pocock.

I.—ON THE TERMINOLOGY AND EVOLUTION OF THE GONOPODS AND OF THE PENIS.

THE modified appendages of the seventh segment in the males of the Helminthomorphous Diplopods are commonly spoken of as "pedes copulativi," "gonopods," or, more